Science Parent Workshop

Science Agenda

- Overview for science across all years
- Links to the national curriculum
- Lesson structure
- Examples of work and tasks
- Low stakes quizzes

Sudbourne Science curriculum

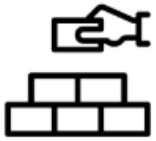
KS1	Autumn	Spring	Summer
Cycle 1 2023 – 2024 (Year 2)	Living things and their habitats Animals, including humans	Uses of everyday materials Revisit Living things and their habitats / materials	Plants Revisit Living things and their habitats / Animals, including humans
Cycle 2 2024 – 2025 (Year 1)	Seasonal changes and daily weather Introduce Plants – (trees) Animals, including humans	Everyday materials Revisit 1: Animals, including humans	Plants Revisit 2: Plants, Animals including humans
LKS2			
Cycle 1 2023 – 2024 (Year 4)	Living things and their habitats States of matter	Animals, including humans	Electricity Sound
Cycle 2 2024 – 2025 (Year 3)	Rocks Animals, including humans Revisit Rocks	Forces and magnets Plants	Plants continued Light
UKS2			
Cycle 1 2023 – 2024 (Year 6)	Electricity Animals including humans (circulatory system)	Animals including humans (water transport) Light	Living things and their habitats Evolution and inheritance
Cycle 2 2024 – 2025 (Year 5)	Properties and changes of materials Animals, including humans	Forces (Gravity and Galileo) Earth in space	Living things and their habitats Forces continued

How our curriculum links to the National Curriculum

Our curriculum is based off evidence-led practice which allows us to teach pupils with the most efficient methods while fostering a love of science. The curriculum is designed in a cumulative manner in which learning is built upon, lesson by lesson and year by year. Pupils study all elements of science (biology, chemistry and physics) in all year groups covering all modules that is expected and outlined in the National curriculum.

Our curriculum is sequenced in a way to ensure children can understand each concept with additional focus on vocabulary to underpin pupils' understanding.

Science in Early Years



1. Foundational knowledge: what pupils should know and be able to do throughout the EYFS and how this will support their development and prepare them for Key Stage 1

2. Opportunities and experiences: how this foundational knowledge can be learnt through play and through guided activities that will allow pupils to explore, experiment with and think hard about new and important concepts

3. Structured Story Time: core texts that will introduce key language, ideas and themes that pupils will need to access the foundational knowledge, built into a framework that uses all that we know about effective literacy instruction

An example of one years curriculum

Starting point	September 2024 – July 2025		Lower Key Stage 2 Science								Cycle 2	
		Strong Start	Autumn 14 weeks			Strong Start	Spring 12 weeks			Strong Start	Summer 12 weeks	
LKS2 Class	SECURING Year 3 ADVANCING Year 4	Science | Becoming a scientist	Y3 Rocks 6 KNs Y3 KNs / Y4 KNs 6 sessions	Y3 Animals including humans 3 KNs Y3 KNs / Y4 KNs 4 sessions (+1)	Y3 Revisit Rocks 3 KNs Y3 KNs / Y4 KNs 3 sessions + 1 enrichment opportunity	Science | Becoming a scientist	Y3 Forces and magnets 6 KNs Y3 KNs / Y4 KNs 6 sessions	Y3 Plants 3 KNs 6 KNs in total Ref lesson / Y3 KNs / Y4 KNs 5 sessions (+2)		Science | Becoming a scientist	Y3 Plants 3 KNs Y3 KNs / Y4 KNs 5 sessions (+2)	Y3 Light 3 KNs Y3 KNs / Y4 KNs 6 sessions (+3)

This is a strong start lesson. These recap the critical knowledge for the module as well as skills or themes for it. Having this time allows pupils to grasp the fundamentals of modules and ask deep, probing questions in future lessons.

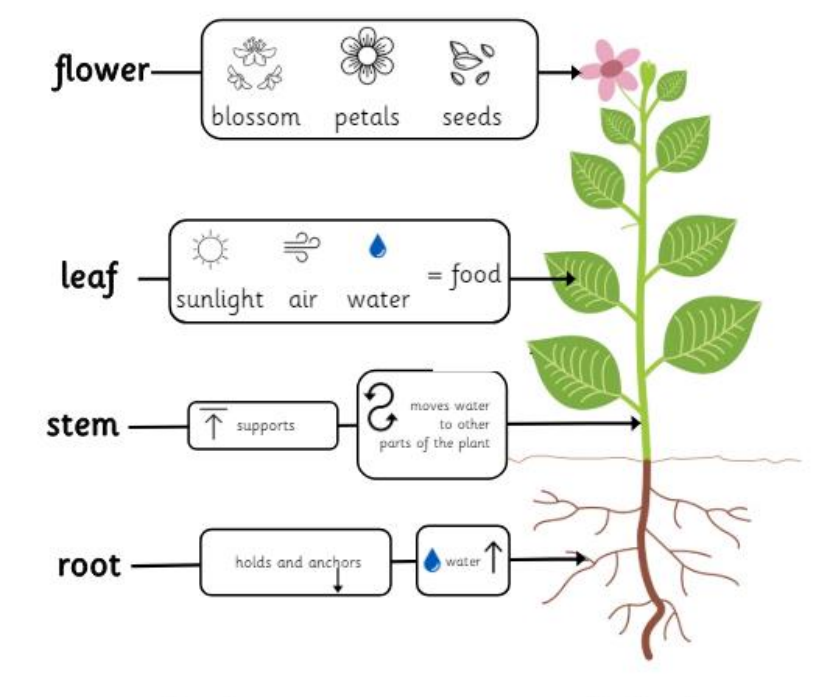
Our curriculum plans in additional lessons to enrich the learning and develop a love of learning for the topic. These are lessons children remember throughout their school journey often leading to experiments and practical lessons.

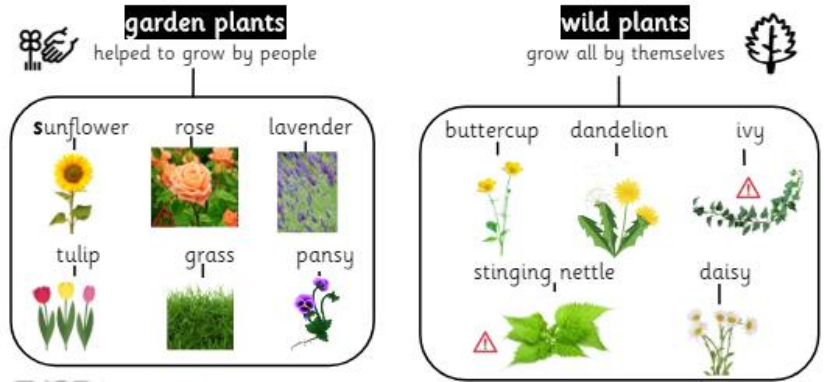
Working scientifically and thinking hard tasks

Working Scientifically					
					
Asking simple question and recognising that they can be answered in different ways	Observing closely, using simple equipment	Performing simple tests	Identifying and classifying	Using their observations and ideas to suggest answers to questions	Gathering and recording data to help in answering questions

Thinking Scientifically				
Identifying and classifying	Pattern seeking	Research using secondary sources	Observing	Fair and comparative testing

These are the principles of working scientifically and skills pupils must learn throughout their school journey. They need to be woven throughout the curriculum and built upon throughout primary school.





These are knowledge organisers. These are stuck into every pupil's book at the start of each module.

It is used to refer back to and support knowledge.

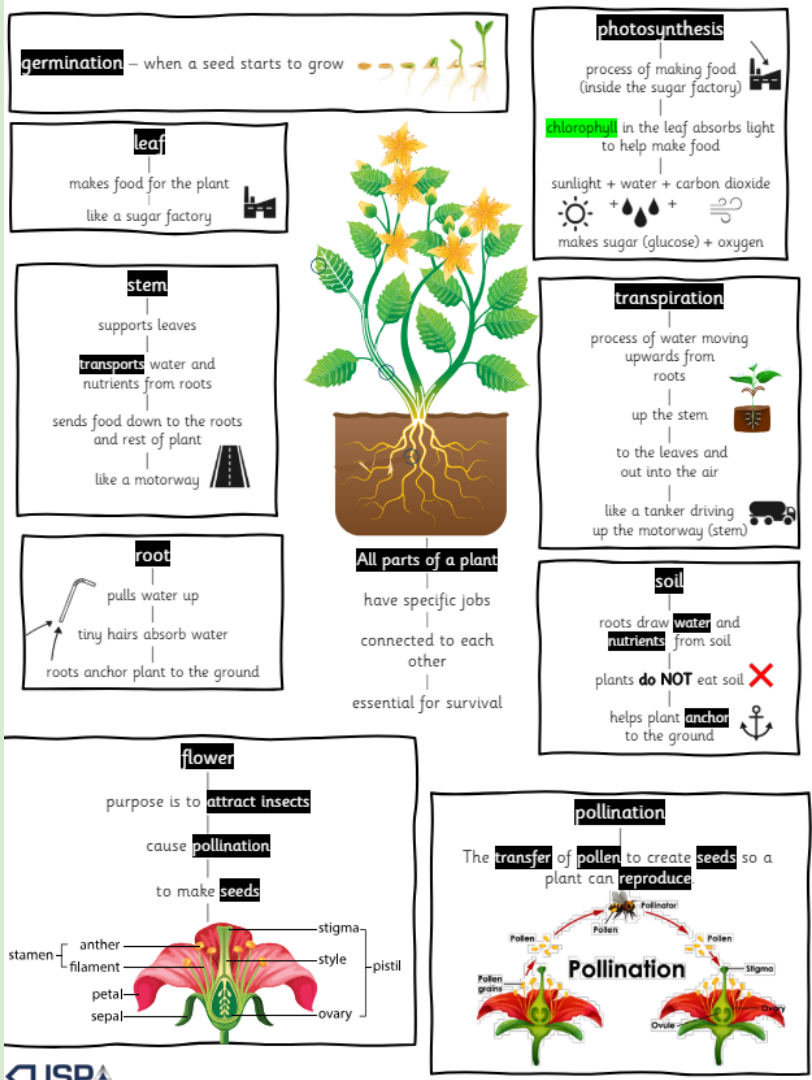
Pupils are encouraged to look back at it during lessons to support independence, as well as make notes on it to support their own learning.

This is an example from Phase 1.

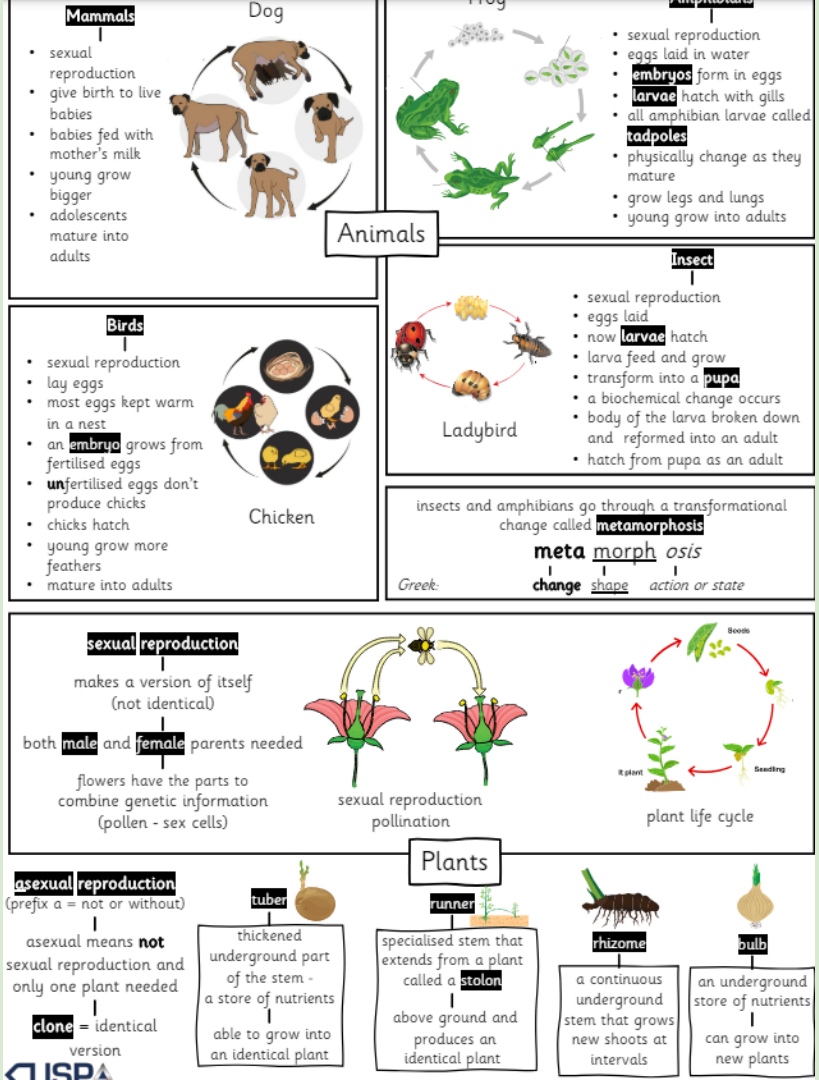
This is an example from Phase 2.

It has more detail than Phase 1 with a larger emphasis on vocabulary. Incredibly useful for pupils to refer to, if needed.

It is also good for visual learners to understand what the topic is about and see topic specific image in context.



Phase 3 is more detailed again and requires more navigation skills to retrieve information to support pupils.



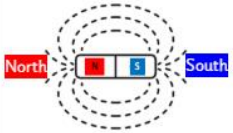
Although more knowledge dense, there is still images and diagrams to help all types of learners.

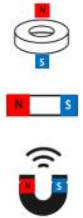
Knowledge notes are similar but reflect each lessons learning. This can look specifically at vocabulary, try to show learning from a different aspect or serve as a reminder for future revision.

5

How do magnets attract and repel objects?

Magnets have an invisible force field that **repels** or **attracts** certain materials





Ring, bar or horseshoe magnets **all** have **north and south poles**

WORKING SCIENTIFICALLY

How can these magnetic ring magnets stay suspended without touching each other on the centre pole?

2

How do surfaces affect the resistance of an object's movement?

resistance is a force that slows down an object that is moving

forces act in **opposite** directions

WORKING SCIENTIFICALLY

Which surfaces would be high resistance and which would be low resistance? Why is that?

	grass
	wooden floor
	carpet or rug
	playground surface

What are the similarities and differences between these surfaces?

The expectation is for children to know these words and use them in lessons - This is taught at the beginning of each lesson is small parts to ensure understanding of the learning about to occur.

Tier 2 multiple meaning or high frequency	
absence	lack of something
cast (shadow)	cause or throw
impenetrable	impossible to pass through
reflect	throw back or bounce back
shadow	dark area caused by an object placed between a light source and a surface
source (light)	origin of something such as light

Tier 3 subject specific	
constant	something that does not change
dependent	unable to do without
independent	separate; not relying on others
illuminate	light up
translucent	allowing light to pass through partially
variable	something that can be changed

Prefix / Suffix / Root	Meaning	Examples
-ate	become	illuminate, animate, originate
im	not	impossible, impenetrable, imperfect
luc	light	translucent, lucid
lum	light	luminous, illuminate,
pend	hang	depend, independent, pendulum

Researching IPROF

Meat and fish are major sources of protein. Ask pupils how they think people who have a vegetarian or vegan diet obtain their protein. Provide relevant sources, including appropriate websites, and ask pupils to research sources of plant protein. Once they have this information, ask them to plan a meal for a vegetarian or a vegan which contains protein as well as the other food groups.

Researching

Identifying

Deciding IPROF

Pupils have two columns labelled *wild* and *garden* and a counter each. Show images of a range of wild and common garden plants. Pupils decide whether the plant is a wild or a garden plant, placing their counter in the appropriate column to indicate their decision. Challenge: Ask pupils to explain how they distinguished between a wild and a garden plant.

IPROF questions are tasks in the lessons were children have to think scientifically and apply skills they learn over the year.

This stands for

Identifying and classifying
Pattern seeking
Researching using secondary sources
Observing
Fair and comparative testing

Using the IPROF skills, pupils complete a wide variety of tasks to become efficient scientists which can set them up for independent thinking and generate curiosity with the ability to create experiments to test their own hypothesis.

Observing

Observing	**IPROF**
Model observing a plant bulb closely with a magnifying glass. Then orally describe it, listing appropriate Tier 2 and 3 vocabulary. Provide pupils with a selection of bulbs to observe closely using a magnifying glass. They choose one and describe it in as much detail as possible to a partner using the listed vocabulary. Note: Please check that the varieties chosen are safe to handle (daffodil and hyacinth bulbs, for example, can irritate the skin).	
Predicting	**IPROF**
Show pupils a sunflower seed and a large plant bulb (varieties that can be grown indoors). Ask them to predict which one will grow into the tallest plant and explain their reasoning. Plant the seed and the bulb. Observe and monitor growth over time. Compare the outcome with pupil predictions. If relevant, share and discuss the quotation: Mighty oaks from a tiny acorn grow.	

Comparative testing

DESCRIBE IT
What are the features of amphibians?

helpful words

frogs
toads
soft eggs
cold-blooded
breathe underwater
air
slimy skin

amphibians

say write draw

12 / 3 / 24

KNOW-it Definition

Tick one. The word *scales* means:

- ☐ things that grow out of a bird's skin
- ☑ thin plates on the skin of fish and reptiles

True or false?

The word *reptile* means a furry animal that makes milk for its babies.

☐ True ☒ False

What does the word *omnivore* mean?

The eats plas and meat

Task 1

Proving

A seal is an lives on land and in water so it must be an amphibian.

Prove me wrong!

becase amphibians are cold-blooded and mammal is warm blooded

Task 2

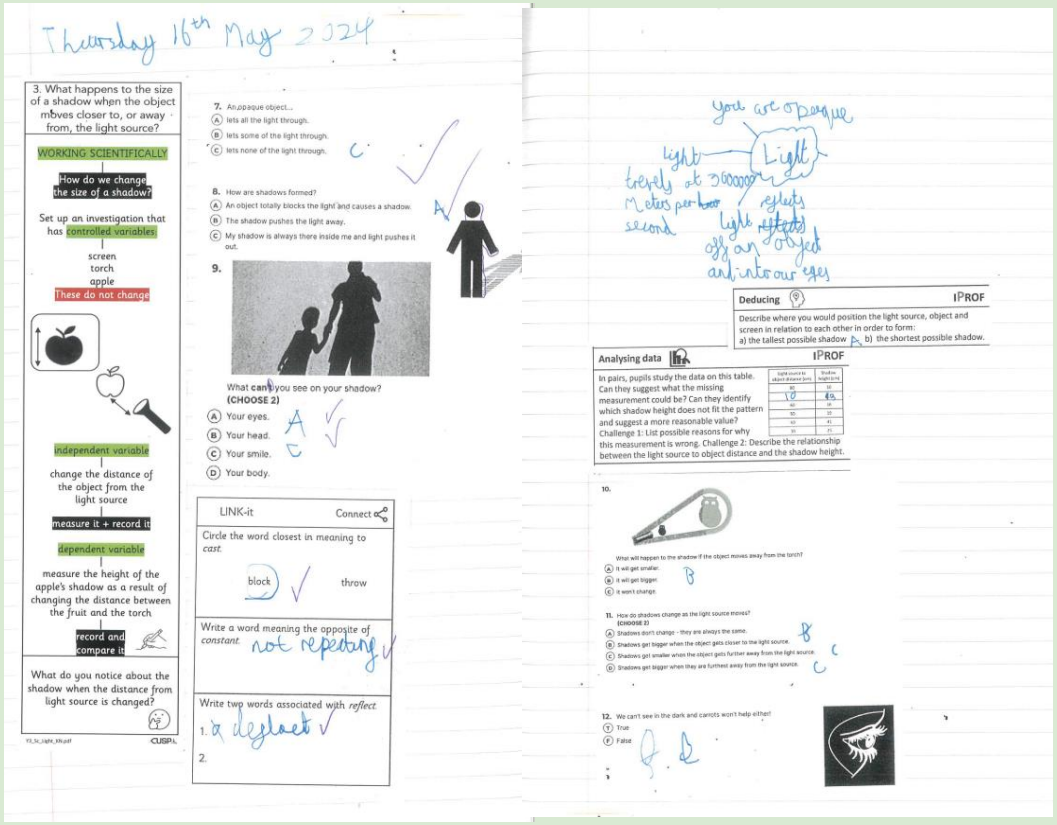
Questioning

IPROF

Write down three questions you have about any amphibian in the video.

1. why do frogs chags colrs and
2. why do frogs lay egg in the flood
3. why do frogs breathe useng their lags

Phase 1 work example


Thursday 16th May 2024

3. What happens to the size of a shadow when the object moves closer to, or away from, the light source?

WORKING SCIENTIFICALLY

How do we change the size of a shadow?

Set up an investigation that has controlled variables

screen
torch
apple

These do not change

independent variable

change the distance of the object from the light source

measure it + record it

dependent variable

measure the height of the apple's shadow as a result of changing the distance between the fruit and the torch

record and compare it

What do you notice about the shadow when the distance from light source is changed?

7. An opaque object...
(A) lets all the light through.
(B) lets some of the light through.
(C) lets none of the light through. C

8. How are shadows formed?
(A) An object totally blocks the light and causes a shadow.
(B) The shadow pushes the light away.
(C) My shadow is always there inside me and light pushes it out.

9.

What can you see on your shadow? (CHOOSE 2)
(A) Your eyes. A ✓
(B) Your head.
(C) Your smile. C ✓
(D) Your body.

LINK-it Connect

Circle the word closest in meaning to *cast*.
block ✓ throw

Write a word meaning the opposite of *constant*. not repeating ✓

Write two words associated with *reflect*
1. ✓ deflect ✓
2.

You are opaque
Light
light travels at 300000 meters per second
reflects light off an object and into our eyes

Deducing IPROF

Describe where you would position the light source, object and screen in relation to each other in order to form:
a) the tallest possible shadow b) the shortest possible shadow.

Analysing data IPROF

In pairs, pupils study the data on this table. Can they suggest what the missing measurement could be? Can they identify which shadow height does not fit the pattern and suggest a more reasonable value? Challenge 1: List possible reasons for why this measurement is wrong. Challenge 2: Describe the relationship between the light source to object distance and the shadow height.

Light source to object distance (cm)	Shadow height (cm)
30	30
40	45 ✓
50	50
60	55
70	60

10.

What will happen to the shadow if the object moves away from the torch?
(A) It will get smaller.
(B) It will get bigger. B
(C) It won't change.

11. How do shadows change as the light source moves? (CHOOSE 2)
(A) Shadows don't change – they are always the same.
(B) Shadows get bigger when the object gets closer to the light source. B
(C) Shadows get smaller when the object gets further away from the light source. C
(D) Shadows get bigger when they are furthest away from the light source.

12. We can't see in the dark and carrots won't help either!
(T) True
(F) False F ✓ D

Phase 2 work example

Wednesday 24th January 2024

GIVE ONE	GET ONE
Friction is decreased by lubricants.	Gravity pulls you to the core
Air resistance is a type of friction.	Friction opposes the direction of objects movements.
Speed affects air resistance.	Air resistance is when air slows down an object.

Exploring **IPROF**

Investigate how the shape of an object affects the time it takes to fall through water. Pupils test different shapes of equal mass made from Plasticine™ by dropping them into identical containers of water. Pupils decide whether timing or racing the shapes is more accurate. Discuss the benefits of streamlining by considering examples in nature / the real world, e.g. dolphin, sting ray, cormorant diving for fish, submarine design etc.

HYPOTHESIS

I predict that the cylinder shape will fall faster than the sphere shape because its more air resistance.

MATERIALS USED:

- Blu-tack.
- Water.
- Timer.

3. What's the effect of water resistance?

water

push occurs when an object moves through water

upthrust

force acts upwards on objects in liquid or gas

IMPORTANT TO KNOW

SHAPE

The shape of the object changes the amount of water it displaces

more liquid or gas displaced

more upthrust

Working scientifically

hypothesis

The same piece of Plasticine™ can sink and float

Use what you know to increase the upthrust of water to make the Plasticine™ float

Dependent variable

Controlled variable

Independent variable

Measure

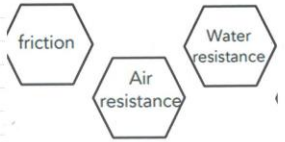
Dependent variable

INSTRUCTIONS

- ~~Drop~~ Hold shapes above water
- Drop at same time
- Measure how long it takes to fall

RESULTS

I was correct! The cylinder was faster.



Control variable- something you keep the same.

Independent variable- something you change.

Dependent variable- something you measure.

Conclusion: Spheres are less air resistant than cylinders.

Phase 3 work example

What are the quizzes and how do they help children to learn?

6. This small dwarf planet is called....

(A) Saturn.

(B) Pluto.

(C) Mars.

(D) I'm not sure.

7. The Moon changes size as it orbits the Earth.

(T) True

(F) False

8. Waxing means...

(A) getting larger.

(B) getting smaller.

(C) I'm not sure.

9. Gibbous means...

(A) a thin slither of moon.

(B) a new moon shrouded in darkness.

(C) inbetween a half and full moon.

Low stake quizzes happen. The questions are linked on the previous or current learning knowledge. The theory behind this is to develop children's long term memory of information recall. It also enables teachers to quickly address and misconceptions

This is a chance for pupils to share their thoughts and explain their answers.

7. The stage of an unborn human for the first 7 weeks is called...

(A) a foetus.

(B) an embryo.

(C) a baby.

(D) I'm not sure.

8. At 8 weeks this unborn human is called...

(A) a foetus.

(B) an embryo.

(C) a baby.

(D) I'm not sure.

Thank you for listening about science at Sudbourne.